None of the references relied on by the Examiner, whether considered individually or collectively, either discloses or suggests a cancer treatment method wherein mechanical pressure waves are applied to a tumor ***at a mechanical resonance frequency of the entire tumor as a unitary body*** to effectively destroy the tumor.

Wilk discloses a flexible carrier with a plurality of acoustic or electromechanical transducers for generating and detecting ultrasonic pressure waves in a patient. Wilk, however says nothing about the invention of claim 1, particularly, the applying of mechanical pressure waves to a tumor at a mechanical resonance frequency of the entire tumor as a unitary body or as a whole, to effectively destroy the tumor.

Granz discloses the use of ultrasonic pressure waves to destroy tumors. However, the pressure waves are applied with a frequency and amplitude to destroy the tumors by local hyperthermia. Thus, the temperature of the tumor tissue is selectively raised by the application of ultrasonic pressure waves to destroy the tumor by heat. There is nothing in Granz which suggests the application of mechanical pressure waves to a tumor ***at a mechanical resonance frequency of the tumor*** to effectively destroy the tumor.

With respect to the technique for tumor destruction, the disclosure of the Drewes reference is considered closer than the disclosure of Granz to the invention of claim 1. Drewes discloses the use of resonant frequencies. However, pursuant to the clear teachings of Drewes, the resonant frequency used is that of ***individual cells*** of a tumor, ***not of the tumor as a whole*** as set forth in claim 1.

Pursuant to the present invention as set forth in claim 1, mechanical pressure waves are

applied to a tumor ***at a mechanical resonance frequency of the entire tumor***, not at a mechanical resonance frequency of a ***cell*** of the tumor. The present invention contemplates that a tumor is a cohesive body which as a body resonating at one or more particular frequencies. In contrast, Drewes says nothing about a tumor body having a characteristic resonant frequency and instead teaches that resonant frequencies are those of the individual cells. Of course, any resonance of an individual cell occurs at a significantly higher frequency than resonance of an entire tumor body comprising enormous numbers of individual cells.

Drewes teaches away from the present invention by directing the attention of those of ordinary skill in the art to the high resonant frequencies of individual cells, as opposed to the resonant characteristics of entire tumors.

Claim 17 As set forth in independent claim 17, a medical treatment system comprises a carrier, a plurality of electromechanical transducers mounted to the carrier, an a-c current generator operatively connected to at least some of the transducers for energizing the transducers with electrical signals of a plurality of pre-established frequencies to produce first pressure waves in the patient, and an acoustic signal processor operatively connected to at least some of the transducers programmed to analyze incoming pressure waves to determine mechanical resonant characteristics of internal tissue structures of a patient, where the incoming pressure waves are generated by the internal tissue structures in response to the first pressure waves. Pursuant to claim 17, the processor is programmed more particularly to determine which of the transducers is to be energized with which of the frequencies to resonantly overload a predetermined one of the tissue structures, thereby mechanically destroying the one of the tissue

structures.

None of the references relied on by the Examiner, whether viewed singly or in combination, either discloses or suggests the apparatus of claim 17, wherein a processor linked to a plurality of electromechanical transducers is programmed to determine, based on incoming pressure waves generated by the internal tissue structures of a patient, (1) mechanical resonant characteristics of the internal tissue structures and (2) which of the transducers is to be energized with which frequencies to resonantly overload a predetermined one of the tissue structures, thereby mechanically destroying the one of the tissue structures.

Wilk and Granz disclose nothing about mechanical resonance and, more particularly, nothing about automatically (via a processor) determining mechanical resonant characteristics of internal tissues structures of a patient.

Drewes does discuss the treatment of internal tissues of a patient with resonant pressure waves. However, Drewes does not teach or suggest the activation of electromechanical transducers by a processor which automatically analyzes incoming (reflected) pressure waves from internal tissues of a patient to determine resonant characteristics or a target tissue structure. Instead, Drewes teaches away from the present invention as set forth in claim 17 by specifically disclosing the selection of a suitable resonant frequency through a separate operation (separate from the *in vivo* treatment of the internal tissues of the patient) wherein a biopsy is performed and the extracted tissue is analyzed outside the body of the patient to determine useful resonant characteristics.

Thus, the teachings of Drewes cannot suggest an apparatus with a processor linked to a

plurality of electromechanical transducers and programmed to determine, ***based on incoming pressure waves generated by the internal tissue structures of a patient***, (1) mechanical resonant characteristics of the internal tissue structures and (2) which of the transducers is to be energized with which frequencies to resonantly overload a predetermined one of the tissue structures, thereby mechanically destroying the one of the tissue structures.

Claim 23 As set forth in independent claim 23, a method for performing a medical operation comprises placing a plurality of electromechanical transducers in pressure-wave-transmitting contact with a patient, energizing at least some of the transducers with an ultrasonic frequency to produce ultrasonic first pressure waves in the patient, energizing at least one of the transducers with another frequency in a range below ultrasonic to produce second pressure waves in the patient, and analyzing ultrasonic third pressure waves produced at internal tissue structures of the patient in response to the first pressure waves to determine three dimensional shapes of the tissue structures and to monitor resonant motion of the tissue structures in response to the second pressure waves.

None of the references relied on by the Examiner suggest the monitoring of resonant motion of tissue structure in a patient.

Again, Wilk says nothing about resonance of tissue structures.

Granz discloses a system for automatically treating tissue structures with ultrasonic energy to heat the tissue structures, wherein the system automatically monitors the location of the target tissue structures. Granz does not disclose or suggest the monitoring, detecting or sensing of resonant motion. In fact, Granz says nothing whatsoever about resonant motion.

Drewes discloses the destruction of tissue structures (individual biological cells) through the application of vibratory energy. However, Drewes says nothing about ***monitoring resonant motion of tissue structures inside a patient***.

Conclusion

For the foregoing reasons, independent claims 1, 17, and 23, as well as the claims dependent therefrom, is deemed to be in condition for allowance. An early Notice to that effect is earnestly solicited.

Should the Examiner believe that direct contact with applicant's attorney would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the number below.

Respectfully submitted,

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Dated: December 14, 2000

APPENDIX TO AMENDMENT TO APPLICATION NO. 09/342,824

1. (Once Amended) A method for treating cancer, comprising:

detecting a tumor in a patient; and

applying mechanical pressure waves to said tumor at a mechanical resonance frequency of [said] the entire tumor as a unitary body, to effectively destroy said tumor.